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Determining Poverty Impacts on Lao People's Democratic Republic and Cambodia: Reconciling Household and GTAP Data

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Abstract

Poverty-related studies are usually general examinations of the impact of policy reforms or major investments on the poor. However, policy changes may have varying consequences across different segments of the poor. To more accurately determine the poverty implications of policy initiatives, it is important to stratify households according to income source and decompose their factor earnings.

This paper applies a method that builds consistency between information in the Lao People's Democratic Republic (PDR) and Cambodian household surveys, and the outputs of the general equilibrium model developed at the Global Trade Analysis Project, or GTAP model. This allows for a consistent platform for translating policy changes to changes in poverty headcount across income strata. Thus, changes in sector outcomes arising from policy reforms or major investments (such as infrastructure projects) can be traced through changes in factor incomes. From there, a connection can be drawn between improvements in sector-specific outcomes and movements of people in and out of poverty. As such, this method will help ensure effective policy design when the objective is poverty reduction. This method can be readily extended to other developing countries' survey data.

Contents

1. INTRODUCTION

The current economic crisis has heightened concerns about poverty across the world. One outcome of the recent Group of Twenty (G-20) meeting in London was a call for all developed countries to fulfill their commitments on providing aid and continued development assistance to the developing world. Indeed, the Asian Development Bank (ADB) recently received a 200% General Capital Increase, while announcing a US$3 billion counter-cyclical support facility for the region.

The extent to which these measures will offset the major economic slowdown in the region remains unclear. The full extent of the slowdown's impacts on the poor is also as yet unknown, but ADB is projecting an additional 131 million poor in 2010 (ADB 2009).

While poverty reduction remains a major pillar in the development agendas of multilateral development banks, the current economic situation has placed increased stress on available resources. Not only are donor countries experiencing pressure at home to prop up their own economies, traditional aid agencies and domestic governments alike are also facing increasing, and increasingly diverse, demands for funds. Rarely has the need to maximize value for every public dollar spent been more important.

Despite the significant inroads made in the region, poverty is still a major challenge in Asia. While cases of extreme poverty (i.e. those living on US$1/day or less) have fallen, the number of those living at or near the poverty line of US$2/day remains high. Along with the rise in the number of 'working poor' has come a rise in income inequality. Indeed, studies have shown increasing levels of income inequality over the last ten years in Asia (Ali 2008).

These trends have not been lost on policymakers. "Equitable growth" and "holistic growth" have become the new catchwords in development policy formulation. Large economies such as India and the People's Republic of China (PRC) have instituted a number of policies to address the potentially destabilizing effects of the over-concentration of benefits within particular groups in society (Ganguly **2009).**

The ultimate distribution of benefits from policy or public spending is pivotal for a number of reasons. First, from a strictly economic sense, as the number of consumers grows, so do opportunities for market expansion and competition. This allows companies to reap the benefits of economies of scale and scope. Economies that support competitive markets enjoy greater innovation and increase consumer utility by widening product choice and service provision. Second, from a social policy perspective, a policy that has limited impacts on income can lead to uneven income growth. This, in turn, can lead to social unrest and the development of a permanent underclass. Aside from raising moral dilemmas, these outcomes represent real burdens on government budgets. Expanding the potential gains from any development project can ease such pressures on government budgets, while simultaneously expanding the tax base. Thus, it is imperative that policymakers understand and anticipate the potential income effects of public spending or policy initiatives, and plan accordingly.

This paper outlines one way of measuring the impact of policy initiatives on the poor. The use of the poverty headcount to measure poverty impact is well established (Bourguignon 2003; Ravallion and Dat 1999; Ravallion and Chen 1997). However, this approach usually measures the impact of policy on the poor in general, and not on specific groups. The consequences of policy reforms vary widely among various household segments, depending on their primary source of income, endowment, and consumption patterns. Therefore, it is important to stratify households according to income source and decompose their factor earnings, when attempting to determine the actual impact of policy measures. This can be done by calculating the effects of changes in the factor earnings on poverty headcount across strata (Hertel et al. 2007a).

In order to measure the impacts of various transport policy initiatives in Cambodia and Lao PDR, households were stratified according to primary income source. Five groups of households that rely almost solely (95% or more) on one source of income were identified. The households that rely on several sources of income (less than 95% on each source) were classified as diversified, and further broken down into rural and urban households. In total, there are seven strata: self employed agriculture based, self-employed non-agriculture based, rural and urban wage earners, transfer-based, and rural and urban diversified (Hertel et al. 2007a).

Income earned by households in Cambodia and Lao PDR was taken from household surveys and categorized into ten factor income sources: Land, Agriculture-Unskilled (AgUnskl); Agriculture- Skilled (AgSkl); Non-agriculture-Unskilled (NagUnskl); Non-Agriculture-Skilled (NagSkl); Wage-Unskilled (WgUnskl); Wage-Skilled (WgSkl); Agriculture Capital (Agcap); Non-Agriculture-Capital (Nagcap); and Transfers. AgUnskl and AgSkl are imputed returns to self-employed agriculture labor. NagUnskl and NagSkl are imputed returns to self-employed non-agriculture labor. WgUnskl and WgSkl are labor wages that were reported directly in the survey as wage earnings. Land and Agcap are split from the residual of agriculture profits and determined by alpha (as derived from the Global Trade Analysis Project [GTAP] database). Nagcap is the residual of non-agriculture profits. Finally, transfers include both public and private transfers (Hertel et al. 2007a).

The remainder of the paper is organized as follows: Section II outlines the data cleaning procedure; Section III describes how the Cambodia and Lao PDR household data were linked to the GTAP data; and Section IV briefly discusses the methodology's strengths and weaknesses. The succeeding sections illustrate the structure of poverty around the neighborhood of the poverty line, and provide some policy implications. The last section concludes.

2. "CLEANING" THE HOUSEHOLD DATASETS

This paper uses the Cambodia Household Socio-Economic Survey from 2003 to 2004 and the Lao Expenditure and Consumption Survey (LECS III) from 2002 to 2003. The Cambodia survey includes all 24 provinces, from which 900 villages (6.3%) were selected, with probability proportional to size. The Cambodia survey covers household socio-demographics such as age, educational attainment, occupation, industry, sector, and possession of durable goods. It also contains household income, household consumption, crop production, and household expenditure, time use, as well as social indicators such as health, fertility, HIV/AIDS,[1] migration, and victims of violence. LECS III's sampling frame comprises all 18 provinces, from which 540 villages (5%) were sampled with probability proportional to size (i.e., number of villages per province). LECS includes the following variables: age, educational attainment, industry, sector, possession of durable goods, time use, household income, household consumption, crop production, and household expenditure, as well as social indicators such as health and infrastructure.[2]

Both datasets were "cleaned" using the following procedure:

a. Observations with missing socio-demographic variables and household income were deleted, as there were no relevant information on which to base the imputation of values. The Cambodia dataset initially consisted of 14,984 households, but 11 households were deleted; therefore, only 14,973 households were used. As for Lao PDR, only one respondent was deleted, leaving 7,998 households for analysis.

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[1] Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome

[2] Details of the Cambodian survey are included as Appendix 1 and those for Lao PDR as Appendix 2.

b. Units of analysis across these spreadsheets were standardized at the *household* level. Some variables reported by all household members— such as wage, outputs, expenses, profits, property rents, dividends, and transfers—were thus aggregated into a single value representing the whole household.

c. Wages were imputed to self-employed income using the mean wage of respondents with the same set of characteristics (including age, education, skill, and industry of employment). For observations that did not match, *education* and *industry* were aggregated into larger classifications (Tables A1.3, A1.4, and A2.2). To illustrate, wages of employed respondents who were reported as 18 years old, *seventh grader*, unskilled, and farmers could not be used to impute wages for self-employed respondents who had similar characteristics—i.e., 18 years old, unskilled and farmer, but were *eighth graders*. To remedy this, all respondents who finished sixth to eighth grade were collapsed into one category called l*ower secondary;* this allowed a match between self employed respondents and wage earners who possessed a similar set of characteristics: 18 years old, unskilled, farmers, and lower secondary (that is, either sixth, seventh, or eighth graders). This procedure greatly increased the number of matched respondents.

d. Some missing *industry* data were filled using the information or clues provided by *occupation.* For example, for some respondents whose occupations were salespersons or security guards, it was assumed that the corresponding industry is services.

e. One concern about the Lao PDR dataset was that respondents were classified into agriculture and non-agriculture workers, but were not categorized as employed or self-employed. To separate the employed from the self employed among the non-agriculture workers, the following approach was taken: based on the responses of the household-head to questions about family business, if a household owned a non-agriculture business, then he or she was self-employed. Also, if the other household members worked in the same industry as the household head, then they were assumed to be working in the family business, and classified as self-employed. Among the agriculture workers, based on the household heads' responses to agriculture business-related questions in the questionnaire, if a household operated its own agriculture business, then he or she was considered self-employed. Households that did not run their own farm business were assumed to be employed by other people who ran an agricultural business.

f. For Cambodia, *occupation* was used to determine the skill level for each income category. However, the Lao PDR dataset did not report *occupation*. Thus, *education* (Table A2.2) was used as proxy indicator for *skill* in the Lao PDR data, since studies have shown that workers' productivity or skill depends both on years of education and what is learned at school (Heckman, Layne-Farrar, and Todd 1995; Murnane, Willett, and Levy 1995 in Fasih 2008). Ninth graders and above were considered skilled, and the rest were categorized as unskilled.

g. Finally, for the Lao PDR dataset, 90% of crop price data were taken from the Food and Agriculture Organization Statistics (FAOSTAT) database.

3. LINKING REPORTED INCOME TO THE GTAP PRIMARY FACTORS

Household income was linked to the GTAP factors following the methodology in Ivanic (2004):

Assumption 1, Wage labor: Wages are received by employed household members, not by employers, or the self-employed. These include cash and in kind (with reported cost estimates provided in the respective questionnaire).

Assumption 2, Skilled labor: Reported and imputed wages were classified based on a person's skill level as either skilled or unskilled. For Cambodia, GTAP's definition was followed: all professional workers and managers were classified as skilled; unskilled otherwise. For Lao PDR, education was used as proxy (as described above).

Assumption 3, Transfers: Transfers include both government and private transfers.

Assumption 4, Property rents: Property rents are either agriculture or non-agriculture property rents. Agricultural property rents include rental payments for land, farming equipment, and other agricultural instruments. Non-agricultural property rents include rental payments for buildings, houses, non-agricultural equipment, and non-agricultural dividends. In the Cambodia dataset, agricultural property rents include rental payments for land and ponds, while non-agricultural property rents include dividends and rental payments for house and building space. In the Lao dataset, agricultural property rents include rental payments for land, while non-agricultural property rents include dividends and rental payments for house and building space.

Assumption 5, Agriculture vs. non-agriculture: Based on the definition in the Cambodia and Lao PDR questionnaires, farming, livestock, fishing, and forestry are considered agricultural, while mining, services, and manufacturing are non-agricultural.

Assumption 6, Imputation of capital: The value of capital is the residual of the reported business income less the estimated return to labor. This applies to both agriculture and non-agriculture sector.

Assumption 7, Estimated returns to labor: The imputed labor income for all household members involved in the business. The imputed labor income for a household member was determined as the average wage of all workers in the survey dataset that: (i) earned wage income only; and (ii) possessed an identical set of personal characteristics, i.e., age, education level, skill level, and industry of employment.

Assumption 8, Returns to Land: The value of returns to land is the GTAP-determined fixed ratio of capital returns in agriculture. Returns to land and capital were split from the sum of agricultural property rents and the residual of reported business income and imputed wage, using the factor payment shares from the GTAP database derived from econometric studies of cost shares in agriculture (Hertel, Ivanic, and Cranfield. 2004). For Asia, alpha is .88 (Table 1).

Assumption 9: Following the definition of business income in Ivanic (2004), agricultural business income includes imputed agricultural wage, returns to capital, and returns to land, while non-agricultural business income contains imputed non-agricultural wage, non-agricultural capital, and non-agricultural property income. Total household income includes all sources of household income; that is, the sum of all factor income: Agskl, AgUskl, Nagskl, NagUskl, Wgeskl, WgeUskl, Agcap, Land, Nagcap, and Transfers.

Table 1: Definition of Factor Income

Factor return	Definition
Agri Skilled labor	Imputed agri skilled labor
Agri Unskilled labor	Imputed agri unskilled labor
Non-Agri Skilled labor	Imputed non-agri skilled labor
Non-Agri Unskilled labor	Imputed non-agri unskilled labor
Wage Skilled labor	skilled labor wages
Wage Unskilled labor	Unskilled labor wages
Agri capital	$Max(0,(1-\alpha)((b_a - \overline{w}_a)+p_a))$
Non-agri capital	$Max(0,((b_n - \overline{w}_n)+p_n)$
Land	$Max(0,(\alpha((b_a - \overline{w}_a)+p_a))$
Transfers	Private transfers + public transfers

* α = 88%; b_a =agricultural business income; b_n =non-agricultural business income; $\overline{w}_a$ =imputed agriculture labor;

$\overline{w}_n$ =imputed non-agriculture labor; p_a = agricultural property rent; p_n = non-agricultural property rent.

Table 2 is a revised version of the example in Ivanic (2004) of how business income is broken down, following the formulas in Table 1. For example, if a household reported a total of US$100 of agricultural business income, of which US$60 is imputed labor income from agricultural activities, profit is equal to US$100 less imputed wage; that is, US$40. The combined return to land and capital is equal to the profit plus reported property income. To obtain the returns to land, multiply this figure (US$70) with the GTAP determined alpha, 88%. In the non-agricultural business, the return to capital would be zero, as the imputed wage is equal to reported business income.

Table 2: Breakdown of Business Income

	Agricultural business income	Non-agricultural business income
a) Reported business income	60 +40 =100	60+0=60
b) imputed wage	**60**	60
c) residual (a-b)	100-60 =40	60-60=0
d) reported property income	30	30
e) land +capital (c+d)	30+ 40	0
f) returns to land	70α	0
g) returns to capital	70(1-α)	0

4. STRENGTHS AND WEAKNESSES

While other poverty impact analysis methodologies like cross-section regressions show the impact of policy reforms on general poverty, their results hide the specific gainers and losers of such reforms. Applying this paper's method, GTAP can utilize multi-poverty elasticities which capture the shape of income distribution for specific subgroups from the survey data, and thus determine the mobility and distributional welfare of these subgroups in different simulations (Hertel, Keeney, and Winters 2007b).

Compared to national accounts data, survey data better reflect labor force classification without significant sampling bias. However, the real size of economic activities may be understated; some households may underreport their incomes, and it is likely that the richest households are underrepresented. To address this issue, Ivanic (2004) added the residual of the GTAP totals and the survey factor returns to the survey data. It is important that surveys are properly designed in order to minimize the discrepancy.

Imputation of labor income to self-employed individuals decreases the variance, as values in this variable tend to lump together towards the mean. In order to better capture the true variability across labor income values, future household surveys can include questions on the actual income of household members who participate in the household business. Also, this methodology can be improved by utilizing surveys that have better coverage than the Cambodia (6.3%) and Lao PDR (5%) surveys. In sum, the methodology can be readily extended to other developing countries' survey data, provided that they have representative coverage, sound sampling design, good quality, and timely data.

5. STRUCTURE OF POVERTY

The entire population was characterized from poorest to richest. Applying the World Bank's US$1 and US$2 poverty headcounts, 33.8% (ADB 2007) and 77.7% (WDI 2007) of the Cambodian households are below the US$1/day and US$2/day poverty lines, respectively. As for Lao PDR, 28% of the population is below the US$1 poverty line (ADB 2003); while 74% is below the US$2 poverty line (WDI 2007). These poverty lines apply to all subsequent procedures in this paper.

The poverty income levels were taken back into the household strata to give an estimate of the headcount by stratum. Cross-tabulation of the variables *strata* and *households* obtained poverty rate per stratum, poverty headcount share in total poverty, and poverty headcount share in total population. Table 3 shows that in Cambodia, poverty is largely concentrated in the rural diversified followed by the agriculture sectors; in Lao PDR, the poorest are in agriculture, followed by the rural diversified sectors. The frequency tables for occupation and industry in the Cambodia and Lao PDR datasets (Tables A1.5 and A2.3, respectively) substantiate these figures.

Table 3: Structure of Poverty Headcount by Earnings-Based Stratum and country (percent)

Indicator	Agriculture	Non-Agriculture	Urban Labor	Rural Labor	Transfers	Urban Diversified	Rural Diversified	Total
Cambodia: US$1/day								
Poverty rate in stratum	48.5	16.3	26.6	34.2	76.3	17.8	31.8	33.8
Share in total poverty	39.3	3.2	2.0	2.1	1.1	6.3	46.1	100.0
Share in total population	13.3	1.1	0.7	0.7	0.4	2.1	15.6	33.8
Lao PDR: US$1/day								
Poverty rate in stratum	34.81	23.94	20.74	28.00	85.71	15.06	14.84	28.0
Share in total poverty	77.03	4.02	1.25	0.31	0.80	5.36	11.22	100.0
Share in total population	21.56	1.13	0.35	0.09	0.23	1.50	3.14	28.0
Cambodia: US$2/day								
Poverty rate in stratum	90.7	59.9	59.4	72.6	86.8	57.3	78.8	77.7
Share in total poverty	32.0	5.1	1.9	1.9	0.6	8.8	49.8	100.0
Share in total population	24.9	4.0	1.5	1.5	0.4	6.8	38.7	77.7
Lao PDR: US$2/day								
Poverty rate in stratum	82.76	50.53	71.85	64.00	90.48	54.20	62.92	74.0
Share in total poverty	69.27	3.21	1.64	0.27	0.32	7.30	17.98	100.0
Share in total population	51.25	2.38	1.21	0.20	0.24	5.40	13.30	74.0

5.1   Earnings Share at the Poverty Line

Similarly, poverty income levels were taken back into the strata to estimate the average factor income shares in total household income, in the neighborhood of the poverty line. This was done by taking 10% of the population around the poverty line—5% below and 5% above the poverty line—for each stratum, and computing the average factor earnings shares in the total household income. To illustrate, 72% of the total income of the agriculture households around the US$1/day poverty line comes from unskilled agricultural labor, while for Lao PDR the number is closer to 58%. The trends in Table 4 show that households depend highly on (imputed) unskilled labor income.

Table 4: Average Factor Income Shares Using 10% of Stratum HH around the Poverty Line, per Stratum and Country

Strata	AgSkl	Ag Unskl	Nag Skl	Nag Unskl	Wg Skl	Wg Unskl	Ag Cap	Land	Nag Cap	Transfer	Total
Cambodia: US$1/day											
Agriculture	0.00	0.72	0.00	0.04	0.00	0.03	0.02	0.16	0.01	0.01	1.00
Non-Agriculture	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.02	0.12	0.02	1.00
Urban Labor	0.00	0.00	0.00	0.00	0.52	0.46	0.00	0.01	0.00	0.01	1.00
Rural Labor	0.00	0.00	0.00	0.00	0.46	0.50	0.00	0.01	0.01	0.01	1.00
Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.97	1.00
Urban Diversified	0.00	0.19	0.07	0.19	0.18	0.20	0.01	0.04	0.04	0.08	1.00
Rural Diversified	0.00	0.27	0.05	0.19	0.18	0.17	0.01	0.05	0.03	0.05	1.00
Lao PDR: US$1/day											
Agriculture	0.23	0.58	0.00	0.02	0.02	0.02	0.01	0.09	0.02	0.01	1.00
Non-Agriculture	0.00	0.01	0.33	0.32	0.00	0.02	0.00	0.00	0.32	0.00	1.00
Urban Labor	0.00	0.00	0.00	0.00	0.49	0.51	0.00	0.00	0.00	0.00	1.00
Rural Labor	0.00	0.00	0.00	0.00	0.61	0.39	0.00	0.00	0.00	0.00	1.00
Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Urban Diversified	0.09	0.16	0.15	0.16	0.15	0.13	0.00	0.02	0.08	0.07	1.00
Rural Diversified	0.12	0.21	0.11	0.14	0.14	0.09	0.01	0.04	0.10	0.06	1.00
Cambodia: US$2/day											
Agriculture	0.00	0.50	0.00	0.04	0.02	0.03	0.05	0.34	0.01	0.01	1.00
Non-Agriculture	0.00	0.03	0.22	0.62	0.00	0.00	0.00	0.01	0.11	0.01	1.00
Urban Labor	0.00	0.00	0.00	0.00	0.43	0.54	0.00	0.00	0.01	0.01	1.00
Rural Labor	0.00	0.00	0.00	0.00	0.31	0.67	0.00	0.01	0.00	0.00	1.00
Transfers	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.95	1.00
Urban Diversified	0.00	0.14	0.09	0.23	0.15	0.17	0.01	0.06	0.05	0.10	1.00
Rural Diversified	0.00	0.17	0.13	0.20	0.10	0.18	0.01	0.10	0.05	0.05	1.00
Lao PDR: US$2/day											
Agriculture	0.21	0.54	0.00	0.01	0.02	0.01	0.02	0.15	0.01	0.01	1.00
Non-Agriculture	0.00	0.02	0.26	0.38	0.00	0.00	0.00	0.00	0.34	0.01	1.00
Urban Labor	0.00	0.00	0.00	0.03	0.55	0.42	0.00	0.00	0.00	0.00	1.00
Rural Labor	0.00	0.00	0.00	0.00	0.67	0.33	0.00	0.00	0.00	0.00	1.00
Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Urban Diversified	0.08	0.12	0.11	0.18	0.18	0.14	0.00	0.02	0.15	0.02	1.00
Rural Diversified	0.12	0.23	0.00	0.16	0.14	0.11	0.01	0.06	0.10	0.08	1.00

5.2   Poverty Arc Elasticity

Poverty elasticity is usually computed by shocking income by one percent and calculating the change in poverty. However, if there is a gap between income levels at the poverty line and the households' income below such a level, then such an approach may understate

actual poverty impacts. Taking the arc elasticity solves this problem by focusing on the changes in the neighborhood of the poverty line, and increasing the range over which impacts can be measured. Arc elasticity is obtained by computing the change in poverty headcount with respect to the change in the real income of households around the poverty line; this can be approximated by the following formula:

$$E_{cs} = - \frac{dF_{cs}(\bar{y}_c^p)/dy_{cs}^p}{F_{cs}(\bar{y}_c^p)/y_{cs}^p}$$

where $F_{cs}(\bar{y}_s^p)$ is the cumulative distribution function that computes poverty headcount ratio when $\bar{y}_c^p$ is the poverty income level in country *c*.

Lining up the stratum population from poorest to richest, poverty arc elasticities can be computed directly off the slope of the cumulative distribution function in the neighborhood of the poverty line (Hertel ,et.al, 2007a). For example, 48% of the population in the Agriculture stratum in Cambodia falls within 5% (above and below) of the US$1/day poverty level. A 32% change in income results in a 21% decrease in the poverty headcount, implying a poverty elasticity of -0.64 (Table 5). The table also shows that, as expected, elasticities diminish from US$1/day to US$2/day as the density of poor households around the poverty line increases. This trend is more prevalent in Cambodia than in Lao PDR.

Table 5: Poverty Elasticities Using the 10% of Stratum Population, per stratum and country

Strata	Poverty count below poverty line	Poverty count above poverty line	Percent change in poverty headcount	Percent change in income	Poverty arc elasticity
Cambodia: US$1/day					
Agriculture	0.53	0.43	-0.21	0.32	-0.64
Non-Agriculture	0.21	0.11	-0.61	0.86	-0.71
Urban Labor	0.31	0.22	-0.38	0.61	-0.62
Rural Labor	0.39	0.29	-0.29	0.53	-0.54
Transfers	0.82	0.71	-0.14	0.42	-0.33
Urban Diversified	0.23	0.13	-0.56	0.82	-0.68
Rural Diversified	0.37	0.27	-0.31	0.49	-0.64
Lao PDR: US$1/day					
Agriculture	0.40	0.30	-0.29	0.50	-0.58
Non-Agriculture	0.29	0.19	-0.42	0.92	-0.46
Urban Labor	0.26	0.16	-0.50	0.84	-0.59
Rural Labor	0.32	0.20	-0.46	0.74	-0.62
Transfers	0.90	0.81	-0.11	0.61	-0.18
Urban Diversified	0.20	0.10	-0.67	0.96	-0.70
Rural Diversified	0.20	0.10	-0.67	0.94	-0.72
Cambodia: US$2/day					
Agriculture	0.96	0.86	-0.11	0.26	-0.42
Non-Agriculture	0.65	0.55	-0.16	0.29	-0.57
Urban Labor	0.64	0.54	-0.17	0.35	-0.48
Rural Labor	0.78	0.68	-0.13	0.30	-0.45
Transfers	0.92	0.82	-0.12	0.58	-0.21
Urban Diversified	0.62	0.52	-0.17	0.32	-0.55
Rural Diversified	0.84	0.74	-0.13	0.26	-0.49
Lao PDR: US$2/day					
Agriculture	0.87	0.79	-0.10	0.23	-0.44
Non-Agriculture	0.53	0.48	-0.11	0.25	-0.43
Urban Labor	0.76	0.68	-0.10	0.20	-0.52
Rural Labor	0.68	0.60	-0.13	0.36	-0.34
Transfers	0.95	0.86	-0.11	0.78	-0.13
Urban Diversified	0.57	0.51	-0.10	0.18	-0.54
Rural Diversified	0.66	0.60	-0.10	0.18	-0.55

6. POLICY IMPLICATIONS

Knowing the number of people who actually move out of poverty is helpful for any policy initiative. However, it is the variation among the different income groups that informs the entire policy process, and can most effectively assist in designing programs that seek to permanently alleviate poverty. This information can also highlight which groups need special attention, and provide guidance on what kind of assistance may be most appropriate.

As Table 5 shows, different income groups exhibit varying levels of sensitivity to changes in income. For instance, Cambodia's non-agricultural workers and Lao PDR's rural diversified workers earning US$1/day or less show the highest sensitivity to income changes. This is to be expected, as these groups are often made up of casual and/or seasonal workers. Policies aimed at permanent reductions in poverty may be directed at providing more stable market conditions to create more permanent work opportunities. In contrast, and not surprisingly, all groups receiving transfer payments have the least sensitivity to income changes, showing that there has been an historical reliance on this source of income. It also implies that, given the recent decline in remittances, households that rely heavily on transfer payments may experience greater perceptions of hardship, if they lose this dependable flow of funds; moving this particular group out of poverty may not be easy.

Looking across these groups (US$1/day versus US$2/day) it is the rural workers in Lao PDR and the agricultural workers in Cambodia that experience the largest changes. In Lao PDR, for instance, for every 1% increase in income at the US$1/day level, there is a 0.62% decline in the number of rural laborers in poverty. However, at US$2/day, the number is almost half that amount, at 0.34%. Thus, policies that impact on the income of the very poor may be more effective for rural laborers in terms of absolute numbers moved out of poverty than, say, for non-agriculture workers. The number of rural laborers at the US$2/day level is going to be more difficult to change. This implies the need for long term support for this group, and a mechanism to provide for lasting change.

In Cambodia, the differences in elasticity across the US$1/day and US$2/day level are larger across the board, with rural workers in general (laborers and diversified) seeing the biggest difference. Thus, the impacts of changes in income between these two groups are more severe in Cambodia, implying the possibility of having a larger, more entrenched group of working poor.

7. CONCLUSIONS

The paper has shown that by using household survey data, more precise measures of the poverty impacts of various programs can be obtained. This methodology allows information from the Lao People's Democratic republic (PDR) and Cambodian household surveys to be made consistent with the outputs of the GTAP general equilibrium model, providing a consistent platform for translating policy changes to changes in poverty headcount across income strata. Thus, changes in sector outcomes arising from policy reforms or major investments (such as infrastructure projects) can be traced through changes in factor incomes. From there, a connection can be drawn between improvements in sector-specific outcomes and movements of people in and out of poverty. Governments need to understand that different segments of the poor require specific programs, if the goal is to permanently move people out of poverty. Governments must be in a position to anticipate the differential impacts of any given policy, and respond accordingly. Given the constraints on fiscal budgets, the information outlined in this paper should provide much needed guidance and feedback for more effective policy design.

APPENDIX 1: CODES IN THE CAMBODIA DATASET

Table A1.1: Occupation codes

Code	Label	Code	Label
110	Legislators and senior officials	641	Dairy/livestock/poultry producers: Operator, mainly market
120	Corporate managers	642	Dairy/livestock/poultry producers: Operator, mainly subsistence
130	General managers	643	Dairy/livestock/poultry producers: Worker, experienced adult
210	Physical, mathematical and engineering science professionals	644	Dairy/livestock/poultry producers: Helper, aid, assistant
220	Life science and health professionals	651	Apiarists and sericulturists: Operator, mainly market
230	Teaching professionals	652	Apiarists and sericulturists: Operator, mainly subsistence
240	Other professionals	653	Apiarists and sericulturists: Worker, experienced adult
310	Physical and engineering science associate professionals	654	Apiarists and sericulturists: Helper, aid, assistant
320	Life science and health associate professionals	661	Mixed-animal producers: Operator, mainly market
330	Teaching associate professionals	662	Mixed-animal producers: Operator, mainly subsistence
340	Other associate professionals	663	Mixed-animal producers: Worker, experienced adult
410	Office clerks	664	Mixed-animal producers: Helper, aid, assistant
420	Customer service clerks	671	Forestry/charcoal workers: Operator, mainly market
510	Personal and protective services workers	672	Forestry/charcoal workers: Operator, mainly subsistence
520	Models, salespersons and demonstrators	673	Forestry/charcoal workers: Worker, experienced adult
611	Field/vegetable/mixed crop growers: Operator, mainly market	674	Forestry/charcoal workers: Helper, aid, assistant
612	Field/vegetable/mixed crop growers: Operator, mainly subsistence	681	Fishery workers: Operator, mainly market
613	Field/vegetable/mixed crop growers: Worker, experienced adult	682	Fishery workers: Operator, mainly subsistence
614	Field/vegetable/mixed crop growers: Helper, aid, assistant	683	Fishery workers: Worker, experienced adult
621	Tree and shrub crop growers: Operator, mainly market	684	Fishery workers: Helper, aid, assistant
622	Tree and shrub crop growers: Operator, mainly subsistence	691	Hunters and trappers: Operator, mainly market
623	Tree and shrub crop growers: Worker, experienced adult	692	Hunters and trappers: Operator, mainly subsistence
624	Tree and shrub crop growers: Helper, aid, assistant	693	Hunters and trappers: Worker, experienced adult
631	Gardeners, horticultural and nursery growers: Operator, main	694	Hunters and trappers: Helper, aid, assistant
632	Gardeners, horticultural and nursery growers: Operator, main	710	Extraction and building trade workers
633	Gardeners, horticultural and nursery growers: Worker, experience	720	Metal, machinery and related trades workers
634	Gardeners, horticultural and nursery growers: Helper, aid	730	Precision, handicraft, printing and related trades workers
635	Market-oriented animal producers and related workers	740	Other craft and related trades workers

Table A1.1: Occupation codes (cont'd.)

Code	Label	Code	Label
810	Stationary plant and related operators	930	Laborers in mining, construction, manufacturing and transportation
820	Machine operators and assemblers	991	Armed forces
830	Drivers and mobile plant operators	997	Other occupation not classified elsewhere
910	Sales and services elementary occupations	998	Respondents don't know the occupation
920	Agricultural, fishery and related laborers		

Source: Cambodia National Institute of Statistics. 2004.

Table A1.2: Industry Codes

Code	Label	Code	Label
0	Growing of cereals and other crops n.e.c.	25	Manufacture of rubber and plastic products
1	Growing of vegetables, horticultural specialties and nursery	26	Manufacture of other non-metallic mineral products
2	Growing of fruit, nuts, beverage and spice crops	27	Manufacture of basic metals
3	Farming of cattle, sheep, goats, horses, asses, mules and hi	28	Manufacture of fabricated metal products, except machinery a
4	Other animal farming; production of animal products n.e.c.	29	Manufacture of machinery and equipment NEC
5	Growing of crops combined with farming of animals (mixed far	30	Manufacture of office, accounting and computing machinery
6	Agricultural and animal husbandry service activities, except	31	Manufacture of electrical machinery and apparatus NEC
7	Hunting, trapping and game propagation including related ser	32	Manufacture of radio, television and communication equipment
8	Forestry, logging and related service activities	33	Manufacture of medical, precision and optical instruments, w
9	Fishing, operation of fish hatcheries and fish farms; services	34	Manufacture of motor vehicles, trailers and semi-trailers
10	Mining of coal and lignite; extraction of peat	35	Manufacture of other transport equipment
11	Extraction of crude petroleum and natural gas; service activities	36	Manufacture of furniture; manufacturing NEC
12	Mining of uranium and thorium ores	37	Recycling
13	Mining of metal ores	40	Electricity, gas, steam and hot-water supply
14	Other mining and quarrying	41	Collection, purification and distribution of water
15	Manufacture of food products and beverages	45	Construction
16	Manufacture of tobacco products	50	Sale, maintenance and repair of motor vehicles and motorcycl
17	Manufacture of textiles	51	Wholesale trade and commission trade, except of motor vehicl
18	Manufacture of wearing apparel; dressing and dyeing of fur	52	Retail trade, except of motor vehicles and motorcycles; repa
19	Tanning and dressing of leather; manufacture of luggage,	55	Hotels and restaurants
20	Manufacture of wood and of products of wood and cork, except	60	Land transport; transport via pipelines
21	Manufacture of paper and paper products	61	Water transport
22	Publishing, printing and reproduction of recorded media	62	Air transport
23	Manufacture of coke, refined petroleum products and nuclear	63	Supporting and auxiliary transport activities; activities of
24	Manufacture of chemicals and chemical products		
Code	Label	Code	Label
64	Post and telecommunications	80	Education
65	Financial intermediation, except insurance and pension funding	85	Health and social work
66	Insurance and pension funding, except compulsory social security	90	Sewage and refuse disposal, sanitation and similar activities
67	Activities auxiliary to financial intermediation	91	Activities and membership organizations NEC
70	Real estate activities	92	Recreational, cultural and sporting activities
71	Renting of machinery and equipment without operator and of p	93	Other service activities
72	Computer and related activities	95	Private households with employed persons
73	Research and development	96	Extra-territorial organizations and bodies
74	Other business activities	97	Other industry not classified elsewhere
75	Public administration and defense; compulsory social security		

Source: Cambodia National Institute of Statistics. 2004.

Table A1.3: Education codes

Code	Label	Code	Label
0	Pre-school/Kindergarten	11	Class eleven
1	Class one	12	Class twelve
2	Class two	13	Secondary school certificate
3	Class three	14	Technical/vocational pre-secondary diploma/certificate
4	Class four	15	Technical/vocational pre-secondary diploma/certificate
5	Class five	16	College/university undergraduate
6	Class six	17	College/university graduate
7	Class seven	18	Post-graduate
8	Class eight	19	Other
9	Class nine	90	None
10	Class ten	98	Don't know

Source: Cambodia Household Socio-Economic Survey Dataset (2004).

Table A1.4: Recoded Variables

Old codes	New code	Label
Occupations		
110–340	1	Skilled
410–998	2	Unskilled
Industry		
0–6	1	Farming
7–8	2	Forestry
9	3	Fishing
10–14	4	Mining
15–37	5	Manufacturing
40–97	6	Services
Agri or non-agri (from new industry codes)		
1–3	1	Agriculture
4–6	2	Non-agriculture
Education*		
0–6	1	Some elementary-elementary grad
7–9	2	Some junior hs-junior hs grad
10–13	3	-some senior hs- HS graduate
14–15	4	Vocational
16–17	5	Some college-College graduate
18	6	Post graduate
19,90,98,99,	19	attended school but discontinued
no code	20	never attended school

*Cambodia follows a 12-year educational system: elementary or primary education (class 1 to 6), junior high school (class 7 to 9), and senior high school (class 10 to 12)

Source: Ministry of Education, Youth, and Sports, Kingdom of Cambodia 2007.

Table A1.5: Occupations in the Cambodia dataset

Occupations	Frequencies	Valid percent
Legislators and senior officials	327	.8
Corporate managers	61	.1
General managers	81	.2
Physical, mathematical and engineering science professionals	19	.0
Life science and health professionals	153	.4
Teaching professionals	666	1.6
Other professionals	538	1.3
Physical and engineering science associate professionals	17	.0
Life science and health associate professionals	17	.0
Teaching associate professionals	2	.0
Other associate professionals	191	.4
Office clerks	9	.0
Customer service clerks	61	.1
Personal and protective services workers	604	1.4
Models, salespersons and demonstrators	4876	11.5
Field/vegetable/mixed crop growers: Operator, mainly market	94	.2
Field/vegetable/mixed crop growers: Operator, mainly subsistence	9996	23.5
Field/vegetable/mixed crop growers: Worker, experienced adult	1477	3.5
Field/vegetable/mixed crop growers: Helper, aid, assistant	6537	15.4
Tree and shrub crop growers: Operator, mainly market	258	.6
Tree and shrub crop growers: Operator, mainly subsistence	4	.0
Tree and shrub crop growers: Worker, experienced adult	3	.0
Tree and shrub crop growers: Helper, aid, assistant	3	.0
Gardeners, horticultural and nursery growers: Operator, main	10	.0
Gardeners, horticultural and nursery growers: Operator, main	31	.1
Gardeners, horticultural and nursery growers: Worker, experience	2	.0
Market-oriented animal producers and related workers	1	.0
Dairy/livestock/poultry producers: Operator, mainly market	667	1.6
Dairy/livestock/poultry producers: Operator, mainly subsistence	736	1.7
Dairy/livestock/poultry producers: Worker, experienced adult	31	.1
Dairy/livestock/poultry producers: Helper, aid, assistant	819	1.9
Apiarists and sericulturists: Operator, mainly market	1	.0
Apiarists and sericulturists: Helper, aid, assistant	1	.0
Mixed-animal producers: Operator, mainly market	1928	4.5

Table A1.5: Occupations in the Cambodia dataset (cont'd.)

Mixed-animal producers: Operator, mainly subsistence	105	.2
Mixed-animal producers: Worker, experienced adult	9	.0
Mixed-animal producers: Helper, aid, assistant	546	1.3
Forestry/charcoal workers: Operator, mainly market	249	.6
Forestry/charcoal workers: Operator, mainly subsistence	617	1.5
Forestry/charcoal workers: Worker, experienced adult	27	.1
Forestry/charcoal workers: Helper, aid, assistant	116	.3
Fishery workers: Operator, mainly market	708	1.7
Fishery workers: Operator, mainly subsistence	902	2.1
Fishery workers: Worker, experienced adult	84	.2
Fishery workers: Helper, aid, assistant	307	.7
Hunters and trappers: Operator, mainly market	6	.0
Hunters and trappers: Operator, mainly subsistence	3	.0
Extraction and building trade workers	346	.8
Metal, machinery and related trades workers	305	.7
Precision, handicraft, printing and related trades workers	157	.4
Other craft and related trades workers	1652	3.9
Stationary plant and related operators	62	.1
Machine operators and assemblers	1381	3.2
Drivers and mobile plant operators	876	2.1
Sales and services elementary occupations	1880	4.4
Agricultural, fishery and related laborers	46	.1
Laborers in mining, construction, manufacturing and transportation	1494	3.5
Armed forces	315	.7
Other occupation not classified elsewhere	77	.2
Respondents don't know the occupation	2	.0
Total	4249	100.0

Source: Cambodia National Institute of Statistics. 2004.

APPENDIX 2: CODES IN LAO PDR DATASET

Table A2.1: Industry Codes

Code	Label	Code	Label
A	*Agriculture, hunting and forestry*	31	Manufacture of electrical machinery and apparatus n.e.c.
01	Agriculture, hunting and related service activities	32	Manufacture of radio, television and communication equipment and apparatus
02	Forestry, logging and related service activities	33	Manufacture of medical, precision and optical instruments, watches and clocks
B	*Fishing*	34	Manufacture of motor vehicles, trailers and semi-trailers
03	Fishing, aquaculture and service activities incidental to fishing	35	Manufacture of other transport equipment
C	*Mining and quarrying*	36	Manufacture of furniture; manufacturing n.e.c.
10	Mining of coal and lignite; extraction of peat	37	Recycling
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	*E*	*Electricity, gas and water supply*
12	Mining of uranium and thorium ores	40	Electricity, gas, steam and hot water supply
13	Mining of metal ores	41	Collection, purification and distribution of water
14	Other mining and quarrying	*F*	*Construction*
D	*Manufacturing*	45	Construction
15	Manufacture of food products and beverages	*G*	*Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods*
16	Manufacture of tobacco products	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
17	Manufacture of textiles	51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
18	Manufacture of wearing apparel; dressing and dyeing of fur	52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	*H*	*Hotels and restaurants*
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	55	Hotels and restaurants
21	Manufacture of paper and paper products	*I*	*Transport, storage and communications*
22	Publishing, printing and reproduction of recorded media	60	Land transport; transport via pipelines
23	Manufacture of coke, refined petroleum products and nuclear fuel	61	Water transport
24	Manufacture of chemicals and chemical products	62	Air transport
25	Manufacture of rubber and plastics products	63	Supporting and auxiliary transport activities; activities of travel agencies
26	Manufacture of other non-metallic mineral products	64	Post and telecommunications
27	Manufacture of basic metals		
28	Manufacture of fabricated metal products, except machinery and equipment		
29	Manufacture of machinery and equipment n.e.c.		
30	Manufacture of office, accounting and computing machinery		

Table A2.1: Industry Codes (cont'd.)

Code	Label	Code	Label
J	Financial intermediation	*N*	*Health and social work*
65	Financial intermediation, except insurance and pension funding	85	Health and social work
66	Insurance and pension funding, except compulsory social security	*O*	*Other community, social and personal service activities*
67	Activities auxiliary to financial intermediation	90	Sewage and refuse disposal, sanitation and similar activities
K	*Real estate, renting and business activities*	91	Activities of membership organizations n.e.c.
70	Real estate activities	92	Recreational, cultural and sporting activities
71	Renting of machinery and equipment without operator and of personal and household goods	93	Other service activities
72	Computer and related activities	*P*	*Activities of private households as employers and undifferentiated production activities of private households*
73	Research and development	95	Activities of private households as employers of domestic staff
74	Other business activities	96	Undifferentiated goods-producing activities of private households for own use
L	*Public administration and defense; compulsory social security*	*97*	Undifferentiated service-producing activities of private households for own use
75	Public administration and defense; compulsory social security	*Q*	*Extraterritorial organizations and bodies*
M	Education	99	Extraterritorial organizations and bodies
80	Education		

Source: Lao National Statistical Center Committee for Planning and Investment. 2003

Table A2.2: Recoded Variables

Old codes	New code	Label
Industry codes		
1–3	1	Agriculture
10–99	2	Non-agriculture
Education		
Grade	Class	
0–never attended school		0- never attended school
1– Primary	1-5	1-Primary
2–Lower secondary	1-3	2-Lower secondary
3–Upper secondary	1-3	3-Upper secondary
4– Vocational	1-3	4-Vocational
5–University	1-5	5-University
6–Post grad		6-Post graduate
Skill		
Education codes	Skill codes	
0–never attended school	0-2 Unskilled	
1–Primary	3-6 Skilled	
2–Lower secondary		
3–Upper secondary		
4–Vocational		
5–University		
6–Post graduate		

Table A2.3: Industries in the Lao PDR Dataset

Industries	Frequency	Valid Percent
Agriculture, hunting and related service activities	18914	67.4
Forestry logging and related services	1460	5.2
Fishing, operation of fish hatcheries and fish farming	1221	4.4
Coal mining	10	.0
Extraction of crude petroleum and natural gas; service activities	2	.0
Mining of uranium and thorium ores	7	.0
Other mining and quarrying	9	.0
Manufacture of food products and beverages	262	.9
Manufacture of tobacco products	8	.0
Manufacture of textiles	518	1.8
Manufacture of wearing apparel; dressing and dyeing of fur	141	.5
Manufacture of wood and of products of wood and cork	451	1.6
Manufacture of paper and paper products	7	.0
Publishing, printing and reproduction of recorded media	3	.0
Manufacture of coke, refined petroleum products and nuclear	3	.0
Manufacture of chemicals and chemical products	4	.0
Manufacture of rubber and plastics products	8	.0
Manufacture of other non-metallic mineral products	16	.1
Manufacture of fabricated metal products, except machinery a	17	.1
Manufacture of machinery and equipment n.e.c.	1	.0
Manufacture of office, accounting and computing machinery	1	.0
Manufacture of electrical machinery and apparatus n.e.c.	5	.0
Manufacture of radio, television and communication equipment	1	.0
Manufacture of medical, precision and optical instruments	2	.0
Manufacture of motor vehicles, trailers and semi-trailers	1	.0
Manufacture of other transport equipment	4	.0
Manufacture of furniture; manufacturing n.e.c.	43	.2
Recycling	2	.0
Electricity, gas, steam and hot water supply	18	.1
Collection, purification and distribution of water	6	.0
Construction	602	2.1
Sale, maintenance and repair of motor vehicles and motorcycle	69	.2
Wholesale trade and commission trade, except of motor vehicle	13	.0
Retail trade, except of motor vehicles and motorcycles; repair	2334	8.3
Hotels and restaurants	56	.2

Table A2.3: Industries in the Lao PDR Dataset (cont'd.)

Land transport; transport via pipelines	96	.3
Water transport	20	.1
Air transport	1	.0
Supporting and auxiliary transport activities; activities of	154	.5
Post and telecommunications	3	.0
Financial intermediation, except insurance and pension funding	17	.1
Activities auxiliary to financial intermediation	20	.1
Real estate activities	2	.0
Renting of machinery and equipment without operator	3	.0
Research and development	2	.0
Other business activities	94	.3
Public administration and defense; compulsory social security	583	2.1
Education	176	.6
Health and social work	54	.2
Sewage and refuse disposal, sanitation and similar activities	18	.1
Activities of membership organizations n.e.c.	4	.0
Recreational, cultural and sporting activities	6	.0
Other service activities	536	1.9
Activities of private households as employers	37	.1
Total	28045	100.0

Source: Lao National Statistical Center Committee for Planning and Investment. 2003

REFERENCES

Ali, I. 2008. Rising Inequalities in Asia: An Imperative for Inclusive Growth. In A Decade of Developments, edited by M. Kawai and S. Stone. Tokyo: ADBI

Asian Development Bank. 2003. ADB Outlook 2003. ADB: Manila.

———. 2007. ADB Outlook 2007. ADB: Manila.

———. 2009. ADB Outlook 2009. ADB: Manila.

Bourguinon, F. 2003. The Growth Elasticity of Poverty Reduction: Explaining Heterogeneity Across Countries And Time Periods. Centre National dela Recherche Scientifique-Ecole des Hautes Etudes en Sciences Sociales-Ecole Normale Superieure Working Paper.

Cambodia National Institute of Statistics. 2004. Household Socio-Economic Survey, 2004.

Fasih, T. 2008. Educational Outcomes and Their Impact on Labor Market Outcome. In Linking Education Policy to Labor Market Outcomes. Washington, DC: The World Bank.

Ganguly H. 2009. Inclusive development in South Asia, Is this a sign of inclusiveness? The Daily Star, April 30.

Hertel,T.,Maros Ivanic, and John Cranfield 2004. The Earnings Effects of Multilateral Trade Liberalization: Implications for Poverty. The World Bank Economic Review 18:2. Washington, DC: The World Bank.

Hertel, T. Roman Keeney, Maros Ivanic, and Alan Winters. 2007a. Why isn't Doha Development Agenda More Poverty Friendly? GTAP Working Paper No. 37. Indiana. GTAP.

Hertel, T., Roman Keeney, and Alan Winters. 2007b. Distributional Effects of WTO Agricultural Reforms in Rich and Poor Countries. Economic Policy。 Vol. 22. No. 50 289–337.

Ivanic, M. 2004. Reconciliation of the GTAP and Household Survey Data. GTAP Research Memorandum No. 5, February.

Heckman, J., J. A. Layne-Farrar, and P.Todd. 1995. Does Measured School Quality Really Matter? An Examination of the Earnings-Quality Relationship. Quoted in T. Fasih, Educational Outcomes and Their Impact on Labor Market Outcome. In Linking Education Policy to Labor Market Outcomes. Washington, DC: The World Bank.

Lao National Statistical Center Committee for Planning and Investment. 2003. Lao Expenditure and Consumption Survey (LECS III).

Ministry of Education, Youth, and Sports, Kingdom of Cambodia 2007. Quality and Efficiency of Education in Cambodia. http://www.moeys.gov.kh/profile/edu_in_cambodia/quality_efficiency.htm (Accessed in October 2007)

Murnane, R., J. Willet, and F. Levy. 1995. The Growing Importance of Cognitive Skills in Wage Determination. Quoted in T. Fasih, Educational Outcomes and Their Impact on Labor Market Outcome. In Linking Education Policy to Labor Market Outcomes. Washington, DC: The World Bank.

Ravallion, M., and G. Datt. 1999. When is growth pro-poor? Evidence from the Diverse Experience of India's States. Washington, DC: The World Bank.

Ravallion, M., and S. Chen. 1997. What Can New Survey Data Tell Us About Recent Changes In Distribution And Poverty? The World Bank Economic Review11: 357–382. Washington, DC: The World Bank.

World Bank. 2007. World Development Indicators 2007. Washington, DC: The World Bank.